IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
(Case No. 04-533)

In the Application of:		)	
		)	
	Stewart Nathan Ridgley Swatton	)	Examiner: Eric Rush
		)	
Serial No.	10/501,113	)	
		)	Art Unit: 2624
Filed:	July 12, 2004	)	
		)	
Title:	Optical Biometric Sensor with Planar Waveguide	)	Conf. No. 5615
		)	

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDED APPEAL BRIEF

Dear Sir:

This Appeal Brief is amended in response to the June 16, 2008 Notice of Non-Compliant Appeal Brief. The Appeal Brief is amended to (1) contain a statement of the status of all claims at Section III; and (2) to provide a concise explanation of and argue each independent claim separately at Section V.

This Appeal Brief is submitted in accordance with the requirements of 37 CFR 41.37. The fee required by 37 CFR 41.20(b)(2) is submitted herewith.

I. REAL PARTY IN INTEREST

The real party in interest of this pending application is QINETIQ LIMITED, which is the owner by Assignment of the above-identified U.S. patent application.

II. RELATED APPEALS AND INTERFERENCES

There are no Appeals or Interferences related to the above-identified U.S. Patent Application.

III. STATUS OF THE CLAIMS

This application includes claims 1-9.

- Claims 2, 4-5 and 7 are cancelled from the application.
- Claims 1, 3, 6 and 8-9 remain pending in the application, stand finally rejected, and are the subject of this appeal. A copy of claims 1, 3, 6 and 8-9 involved in this appeal, are attached hereto in the Claim Appendix.

IV. STATUS OF AMENDMENTS

There are no amendments outstanding.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention includes independent claims 1 and 8 both of which are directed to biometric sensor apparatuses that are useful in fingerprint or palmprint sensing applications. The sensors can be incorporated into a variety of devices such as cellular telephones for security purposes.

A. The Claimed Biometric Sensors

Figure 2 generally depicts a sensor embodiment of independent claims 1 and 8. Sensor 10 includes a core layer comprising in one embodiment a top glass waveguide layer (56), an intermediate polymer or glass layer (54) and a bottom CMOS detector array (52). The Figure 2 sensor embodiment further includes an interference filter layer (55). Interference filter (55) improves sensor resolution because it "reduces the solid angle of diverted light that is subtended by the CMOS detector array 52 at the point at which the individual's fingerprint ridge makes contact with the waveguide 56." (Page 5, lines 6-9). Sensor 10 further includes means for introducing

radiation. In Figure 2, the means for introducing radiation is described as being diode laser arrays 58 and 60.

In use, a finger or palm is placed on the exposed surface of glass waveguide 56 of the Figure 2 sensor. At positions 51 shown in Figure 2, a fingerprint or palmprint ridge makes contact with the surface of waveguide 56. A proportion of the light within the waveguide 56 ceases to be guided and passes out of waveguide 56, through layer 54 and interference filter 55 and is directed into detector array 52 where it forms an image of the users fingerprint or palmprint. The image can then be compared to a stored fingerprint or palmprint image. (Page 6, lines 4-11).

B. The Claim 1 Biometric Sensors

1. Support For The Claim 1 Invention

Independent claim 1 is directed generally to a direct optical biometric sensor.

The independent claim 1 sensor includes a detecting means for detecting radiation. This feature is described in one embodiment in the specification as a CMOS detector array 12. (See, e.g., Figures 1-2; specification at page 4, lines 3-8)

Another element of independent claim 1 is a radiation directing means for directing radiation from a point of contact of an individual with the radiation directing means towards the detecting means in response to contact of the individual with the radiation directing means at the point of contact. This feature is described in the specification alternatively as a planar slab waveguide having a core layer with a region which is at least partially exposed (See, e.g., claim 1 & specification at page 2, line 31 to page 3, line 3), or as a glass waveguide layer 16 of Figure 1 and glass waveguide layer 56 of Figure 2. (See, e.g., specification at page 4, lines 9-10 & page 4, lines 30 to page 5, line 3).

Yet another element of independent claim 1 is a radiation directing means comprises a planar slab waveguide having a core layer with a region which is at least partly exposed. This feature of independent claim 1 is disclosed in the specification at least at page 2, line 31 to page 3, line 3.

Still another element of independent claim 1 is a means for introducing radiation into the core layer such that radiation propagates throughout the exposed region thereof. This feature is

described in the specification alternatively as one or more diode lasers; (See, e.g., specification page 3, lines 9-12); light emitting diodes (See, e.g., specification page 3, lines 9-12); a plurality of light emitting diodes disposed along the edges of the sensor's waveguide. (See, e.g., specification at page 5, lines 20-21); or as reflective coatings applied to the edges of the sensor waveguide combined with light from a laser diode that is arranged to undergo multiple reflections with the waveguide. (See, e.g., specification at page 5, lines 21-24).

Finally, the sensor of independent claim 1 also includes an interference filter disposed between the planar slab waveguide and the detecting means. An interference filter is identified as layer (55) of Figure 2 and is discussed in the specification at least at page 5, lines 6-9.

2. Means Plus Function Elements Of Independent Claim 1

Application independent claims 1 recites three means-plus-function features. One of the claim 1 means plus function features is narrowed in claim 3. The means-plus-function claim elements and the corresponding structure recited in the specification are as follows:

- A "detecting means for detecting radiation" of claims 1, 3 and 6 refers to CMOS detector array 12 as shown in Figures 1-2. (See specification at page 4, lines 3-8).
- A "radiation directing means for directing radiation for directing radiation from a point of contact of the individual with the radiation directing means towards the detecting means of claims 1, 3 and 6 includes:
    - A planar slab waveguide having a core layer with a region which is at least partially exposed. (See claim 1 & specification at page 2, line 31 to page 3, line 3).
    - Glass waveguide layer 16 of Figure 1 and glass waveguide layer 56 of Figure 2. (See specification at page 4, lines 9-10 & page 4, lines 30 to page 5, line 3).
- A "means for introducing radiation into the core layer" of claims 1, 3 and 6 refers to:
    - One or more diode lasers. (See specification page 3, lines 9-12).
    - Light emitting diodes. (See specification page 3, lines 9-12).
    - A plurality of light emitting diodes disposed along the edges of the sensor's

waveguide. (See specification at page 5, lines 20-21).

- Reflective coatings applied to the edges of the sensor waveguide combined with light from a laser diode that is arranged to undergo multiple reflections with the waveguide. (See specification at page 5, lines 21-24).

B. Independent Claim 8

Independent claim 8 is directed generally to an optical biometric sensor.

The first element of the sensor is a radiation detector which is identified in one embodiment as a bottom CMOS detector array (52). (See, e.g., Figures 1 & 2; specification at page 4, lines 3-8).

The sensor also includes a radiation director capable of directing radiation from a point of contact of an individual with the radiation director towards the radiation detector in response to contact of the individual with the radiation director at the point of contact. This feature is described in the specification as a planar slab waveguide having a core layer with a region which is at least partially exposed. (See. e.g., specification at page 2, line 31 to page 3, line 3). This feature is also described in the specification as a glass waveguide layer 16 of Figure 1 and glass waveguide layer 56 of Figure 2. (See. e.g., specification at page 4, lines 9-10 & page 4, lines 30 to page 5, line 3).

The sensor of claim 8 further comprises a planar slab waveguide having a core layer with a region which is at least partly exposed. This feature of claim 8 is disclosed in the specification at least at page 2, line 31 to page 3, line 3.

The sensor of claim 8 further includes a radiation source for introducing radiation into the core layer such that radiation propagates throughout the exposed region. This feature is described in the specification alternatively as one or more diode lasers. (See, e.g., specification page 3, lines 9-12); light emitting diodes (See, e.g., specification page 3, lines 9-12); a plurality of light emitting diodes disposed along the edges of the sensor's waveguide. (See, e.g., specification at page 5, lines 20-21); or as reflective coatings applied to the edges of the sensor waveguide combined with light from a laser diode that is arranged to undergo multiple reflections with the waveguide. (See, e.g., specification at page 5, lines 21-24).

Finally, the sensor of claim 8 also includes an interference filter disposed between the planar slab waveguide and the radiation detector. Interference filter is identified as layer (55) of Figure 2 and is discussed in the specification at least at page 5, lines 6-9.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1, 3, 6 and 8-9 are obvious over Wong (USP 5,822,445) in view of Johnson (USP 6,444,969).

VII. APPLICANT'S ARGUMENTS IN FAVOR OF CLAIM PATENTABILITY

For purposes of this appeal, the patentability of independent claims 1 and 8 will be argued together unless stated otherwise below.

A. The Examiner's Obviousness Rejection

Claims 1, 3, 6 and 8-9 stand finally rejected under 35 U.S.C. 103 as being unpatentable over Wong in view of Johnson. It is the examiner's position that Wong discloses all of the features of independent claims 1 and 8 except for a sensor including an interference filter disposed between the planar slab waveguide and the detecting means. It is the examiner's position that Johnson "teaches the placement of an interference filter between the waveguide and detecting means." (citing Fig. 1 element 20 & Col. 4, lines 24-30).

B. The Prior Art

1. The Wong Reference

The Wong reference discloses generally an apparatus for identifying fingerprints. The apparatus includes a fingerprint receiving face, an optional diffuser, a light source, and a fingerprint viewing face. The optical path may include an imaging device such as a CMOS device.

2. The Johnson reference

The Johnson reference discloses generally a fingerprint sensor and method. Figure 1 and Col. 4, lines 24-30 of Johnson – which the examiner relied upon in rejecting all claims for obviousness - are reproduced below.

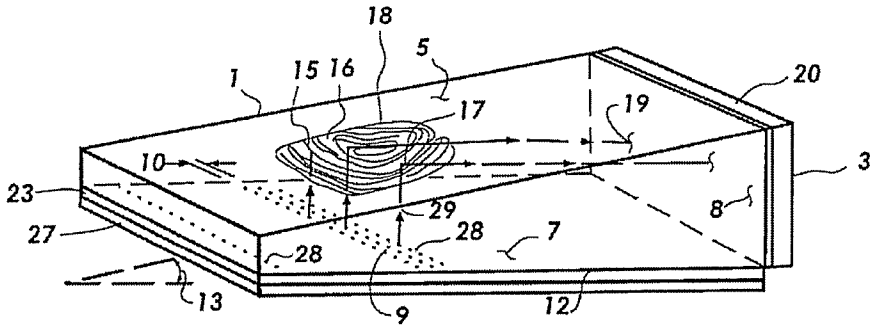

FIG. 1

The sub-beams may be emitted sequentially in a burst and therefore sensed sequentially by a single-receptor photoelectric sensor. The photoelectric sensor may have a filter **20** or may be tuned to detect only the frequency of radiation emitted by the LED array so as to prevent interference from radiation from other sources. Alternatively, filters or shields may be installed on all exposed exterior surfaces of the prism to prevent admission of radiation to the prism from any source other than the LED array. The intensity of the radiation received for each sub-beam in its assign time slot indicates a fingerprint valley or a fingerprint ridge at its corresponding point of illumination. Each pixel of the LED

The function of the Johnson filters is described as follows:

> The photoelectric sensor may have a filter or may be tuned to detect only the frequency of radiation emitted by the LED so as to prevent interference from radiation from other sources. Alternatively, filters or shields may be installed on all exposed exterior surfaces of the prism to prevent admission of radiation to the prism from any source other than the surface emitting laser.

(Johnson at col. 3, lines 1-7).

C. Errors In The Final Obviousness Rejection

The Examiner's obviousness rejection of claims 1, 3, 6 and 8-9 Wong in view of Johnson cannot be sustained because the Examiner has not established a *prima facie* case of obviousness. The Examiner bears the burden of establishing *prima facie* obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). A *prima facie* case of obviousness cannot be

constructed without showing that all of the features of the claimed invention are found in the prior art. *See e.g., In re Rouffet,* 199 Fed.3d 1350, 1359 (Fed. Cir. 1998). A *prima facie* case of obviousness has not been established in this application at least because Johnson does not disclose or suggest the claimed "interference filter".

The examiner relied upon Figure 1 and col. 4, lines 22-30 of Johnson for disclosing an "interference filter". The excerpt of Johnson the examiner relies upon does not refer to filter 20 as an interference filter. Therefore, on this basis alone, the examiner has not set forth a *prima facie* case of obviousness because the examiner has filed to show that Johnson discloses interference filters.

As noted above, Johnson does use the term interference in the specification. It appears, therefore, that the examiner's rejection is somehow based upon linking the filter 20 element with the term "interference" in Johnson. Merely because the word "interference" appears in line 26 of col. 4, does not mean that the filter 20 is an interference filter.

The teachings of prior art references must be considered in their entirety when using the references in the obviousness rejection. In *Bausch & Lomb, Inc. v. Barnes-Hynd Hydrocurve, Inc.*, the Federal Circuit overruled an obviousness rejection where a single line in a prior art reference was taken out of context. 796 F.2d 443, 448 (Fed.Cir. 1986). In *Bausch & Lomb*, the Federal Circuit concluded that considering only a single line of a prior art reference which was taken out of context was an improper hindsight analysis. *Id.* One skilled in the art at the time of the invention, without the Applicant's invention in mind would understand – upon considering the Johnson reference in its entirety - that the term "interference" at line 26 of column 4 refers, not to an "interference filter" type but instead to the function of the filter – preventing detector interference. In this regard, the examiner has rejected the claims based upon picking and choosing from a few select words in Johnson in a void without troubling himself with the technical and scientific teachings of Johnson as a whole. From a technical perspective and from the words of the reference, Johnson does not disclose or suggest an "interference filter" feature.

One skilled in the art at the time of the invention – upon reading Johnson in its entirety - would understand that filter 20 of Johnson is not an interference filter as the examiner maintains.

The purpose of the Johnson filter 20 is to shield the detector from light that does not originate from the LED (external light) in order to protect the detector from interference. (Johnson at col. 3, lines 1-7 & col. 4, lines 26-30). Therefore, one of ordinary skill in the art would understand that the Johnson filter 20 is a simple absorption filter that protects a detector from radiation interference.

An "interference filter" is not the same as an absorption filter or narrow band-pass filter that protect a detector from interference. An interference filter is a known component in optics and a skilled person would understand that an interference filter is a multilayered component that rejects light by interference effects. The specification of the instant application teaches that the claimed interference filter has a multi-layer construction and will reject light incident on the filter at a small angle away from normal incidence even if light of the same the same wavelength is passed at normal incidence - this allows closely spaced features to be resolved. (*See* specification at page 5, lines 6-9).

CONCLUSION

The examiner's anticipation rejection of claims 1, 3, 6 and 8-9 for obviousness is not sustainable because the examiner has filed to meet his burden of showing that each claim feature is described in the cited prior art.

Respectfully submitted,

McDONNELL BOEHNEN HULBERT & BERGHOFF

Date: July 17, 2008

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CLAIMS APPENDIX

CLAIMS ON APPEAL

1. (Previously presented) A direct optical biometric sensor comprising detecting means for detecting radiation and radiation directing means for directing radiation from a point of contact of an individual with the radiation directing means towards the detecting means in response to contact of the individual with the radiation directing means at the point of contact, wherein the radiation directing means comprises a planar slab waveguide having a core layer with a region which is at least partly exposed and means for introducing radiation into the core layer such that radiation propagates throughout the exposed region thereof characterised in that the sensor further comprises an interference filter disposed between the planar slab waveguide and the detecting means.

3. (Previously presented) A sensor according to claim 1 wherein the means for introducing radiation into the core layer of the planar slab waveguide comprises one or more diodes lasers or light-emitting diodes.

6. (Previously presented) An electronic apparatus comprising the sensor of claim 1.

8. (Previously presented) An optical biometric sensor comprising:

a radiation detector;

a radiation director capable of directing radiation from a point of contact of an individual with the radiation director towards the radiation detector in response to contact of the individual with the radiation director at the point of contact, the radiation director further comprising a planar slab waveguide having a core layer with a region which is at least partly exposed and a radiation source for introducing radiation into the core layer such that radiation propagates throughout the exposed region thereof wherein the sensor further comprises an interference filter disposed between the planar slab waveguide and the radiation detector.

9. (Previously presented) The optical biometric sensor of claim 8 wherein the radiation source is selected from one or more diode lasers or one or more light emitting diodes.

EVIDENCE APPENDIX

(Not Applicable)

Related Appeals Appendix

(Not Applicable)